

REMARKS

The Official Action mailed August 19, 2008, has been received and its contents carefully noted. Filed concurrently herewith is a *Request for Two Month Extension of Time*, which extends the shortened statutory period for response to January 19, 2008. Accordingly, the Applicant respectfully submits that this response is being timely filed.

The Applicant notes with appreciation the consideration of the Information Disclosure Statements filed on April 16, 2007, and June 14, 2007.

Claims 1, 3, 11, 18, 26, 28, 32, 34, 37, 39, 42, 44, 45, 47, 50, 52, 53, 55, 58, 60, 69, 71, 74, 76, 77, 79 and 82 are pending in the present application, of which claims 1, 3, 26 and 28 are independent. Claims 1, 3, 11, 26, 28, 69, 71, 74 and 76 have been amended to better recite the features of the present invention. For the reasons set forth in detail below, all claims are believed to be in condition for allowance. Favorable reconsideration is requested.

Paragraph 2 of the Official Action objects to claims 1, 3, 11, 26, 28, 69, 71, 74 and 76 citing various minor informalities. In response, claims 1, 3, 11, 26, 28, 69, 71, 74 and 76 have been amended in accordance with the Examiner's suggestions. Also, claim 11, line 6, has been amended in a manner similar to that suggested for claim 3, line 14. Reconsideration of the objection is requested.

Paragraph 4 of the Official Action rejects claims 1, 3, 11, 18, 26, 28, 32, 34, 37, 39, 42, 44, 45, 47, 50, 52, 53, 55, 58, 60, 69, 71, 74, 76, 77, 79 and 82 under 35 U.S.C. § 112, first paragraph, asserting the following: "The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention" (page 4, Paper No. 20080817). Specifically, the Official Action appears to be concerned with the meaning of "variance" and whether the present inventors had possession of an invention utilizing "variance."

In response, the Applicant has amended independent claims 1, 3, 26 and 28 by replacing "variance" with "fluctuation." Specifically, the independent claims have been

amended to recite comparing a fluctuation obtained from relations between the approximate line and the average values of corrected saturations (or luminances) with a reference value which is determined for a demanded performance of the semiconductor element in order to evaluate the crystallinity of the semiconductor film having the crystallinity that has been improved. The Applicant respectfully submits that the present specification reasonably conveys to one skilled in the relevant art that the present inventors, at the time the application was filed, had possession of the features of the present claims including either "variance" or "fluctuation."

The Official Action sets forth an unreasonably narrow interpretation of the term "variance" and, based on this interpretation, rejects the claims under § 112, first paragraph. Specifically, the Official Action asserts the following: "the Examiner asserts that one having ordinary skill in the art would understand that claiming a 'variance' refers to the mathematical variance defined as either a population variance $\sigma^2 \equiv \langle (X - \mu)^2 \rangle$, or a sample variance $s_N^2 \equiv \frac{1}{N} \sum_{i=1}^N (x_i - \bar{x})^2$. Since the cited sections do not refer to a variance, nor do they provide a measure that is consistent with the well known definition of variance, the specification fails to adequately support the new limitation of 'comparing a variance'" (pages 6-7, Id.). The Applicant disagrees with the Examiner's assertion.

The meaning of the term "variance" need not necessarily be limited to the statistical definitions provided by the Examiner. In addition to the specific meanings noted above, the Applicant respectfully submits that it is equally (if not more) well known that the term "variance" means, more generally, "the fact, quality, or state of being variable or variant" and is not limited to a specific statistical meaning as asserted in the Official Action. Also, the present specification uses a term that is similar to "variation," i.e. "fluctuation" and its variants, to disclose the concept of the present invention.

In fact, the present specification uses the term "variation" in the broader, not necessarily statistical, sense of the term. Referring to the pre-grant publication of the

present application, i.e. U.S. Publication No. 2004/0254769, the term "variation" is disclosed in paragraphs 7, 8, 15, 37, 64, 92, 94, 113, 154 and 157 and in Table 3. Other key terms are supported by the present specification as follows: "compare" and its variants are disclosed in paragraphs 32, 34, 43, 91, 93, 102-108, 118, 118 and 140; "approximate line" is disclosed in paragraphs 23, 72, 93, 94, 131 and 132; "average" is disclosed in paragraphs 23, 27, 45, 46, 50, 72, 88, 92-94, 112, 118, 138-141, 146, 170, 268 and 269 and in Tables 3 and 4; "reference value" is disclosed in paragraphs 91, 93 and 107; "crystallinity" is disclosed in the abstract and in paragraphs 17, 21, 23, 28, 30, 31, 34, 37, 38, 90, 99, 107, 167 and 197; "improved" (with respect to crystallinity) is disclosed in the abstract and in paragraphs 21, 23, 30, 31, 40, 111, 157, 207 and 246; "saturation" is disclosed in paragraphs 46, 57, 58, 74, 75, 88, 96, 102, 109, 112, 114, 118, 141, 146, 269 and 270; and "luminance" is disclosed throughout the specification including but not limited to paragraphs 21, 23 and 92-94.

In order to highlight examples of the claim terms in question in context, paragraphs 21, 23, 91-94, 102 and 107 are reproduced and annotated below:

[0021] According to the invention, a crystallinity of a semiconductor film is improved by irradiating energy beam and then a visible light is irradiated on the surface of the semiconductor film of which crystallinity is improved, and the scattered light is photographed. Then, the photographed image is digitalized to obtain a digital image and the luminance of the digital image is calculated by a computer in a direction perpendicular to the scanning direction of the energy beam over the semiconductor film.

[0023] According to the invention, a visible light is irradiated on the surface of a semiconductor film of which crystallinity is improved by irradiating energy beam and the scattered light of the irradiated visible light is photographed and digitalized to obtain a digital image. When the scanning direction of the energy beam is a Y direction and a direction perpendicular to the Y direction is an X direction in the digital image, a predetermined analysis region of the digital image is divided into m in the X direction and into n in the Y direction, thus m×n basic units are sectioned. An average of luminance of each of the m basic units aligned in the X direction is calculated per each of the n rows aligned in the Y direction. An approximate line of the relation of the average of the luminance to the corresponding alignment in the Y direction is calculated,

thus the crystallinity of the semiconductor film of which crystallinity is improved is tested by the fluctuation of the average of the luminance from the approximate line.

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[0091] An image is processed according to the above-described image processing commonly performed in the invention and the analysis region is sectioned into basic units (301). Needless to say, the image and the image having a reference value for comparison are the same in magnification, shape, light, and photographing condition.

[0092] Subsequently, an average (Bav_{Ym}) or a sum (Bt_{Ym}) of the luminance of basic units having the same Y coordinate in the analysis region is calculated. In the case of photographing a crystallized substrate in a dark field as in this embodiment mode, an image may be dark when an energy density of energy beam is not appropriate, or a luminance variation in stripe shapes (refer to FIG. 4) may appear in the direction perpendicular to the scanning direction of the energy beam (parallel to the X direction). By calculating the average or the sum of the luminance of the basic units having the same Y coordinate, that is the basic units aligned in parallel in the X direction, a luminance tendency of the row can be obtained.

[0093] By the relation of the average (Bav_{Ym}) or the sum (Bt_{Ym}) of the luminance of each Y coordinate, an approximate line is obtained (303). A fluctuation of the data is obtained (304) by this approximate line and compared with a reference value obtained in advance, thus analysis and testing are performed (305). The reference value differs depending on the performance of a semiconductor element demanded as a final product, therefore, it may be determined by an operator appropriately.

[0094] In this method for testing, the larger the average luminance of the analysis region and the smaller the fluctuation are (closer to the approximate line), that is, the smaller the variation of the luminance in the Y direction is, the better electric characteristics can be obtained when such elements as TFTs are formed.

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[0102] After the constant numbers are determined, the process is started as $x=1$, $y=p+1=3$, $v=0$, and $w=0$. Here, x and y are coordinates for the basic units and v and w are counters. The number v counts the pattern in line shape and w counts the number of the basic units aligned of which luminance and saturation are larger than the basic unit apart from the basic unit in process at a distance of $\pm p$ in the Y direction. The number y starts with $p+1$ since the luminance of the basic unit in process is compared with the basic unit at a distance of $\pm p$ in the Y direction. Further, the value of v is used for a final testing.

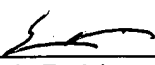
...
[0107] The value of v obtained as described above is compared with the predetermined reference value for analysis and testing. The reference value differs depending on the performance of a semiconductor element demanded as a final product, therefore, it may be determined by an operator appropriately. According to the research made by the present applicants, a larger value of v which is the number of the characteristic patterns indicates the better crystallinity.

The Applicant respectfully submits that one of ordinary skill in the art, upon review of the present specification, would not necessarily limit the term "variance" to the specific statistical formulas asserted in the Official Action. Furthermore, based at least on paragraphs 21, 23, 91-94, 102 and 107 reproduced above, one of ordinary skill in the art would appreciate that the written description supports the claims, which recite comparing a fluctuation obtained from relations between the approximate line and the average values of corrected saturations (or luminances) with a reference value which is determined for a demanded performance of the semiconductor element in order to evaluate the crystallinity of the semiconductor film having the crystallinity that has been improved.

Therefore, the Applicant respectfully submits that the present claims are described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 112 are in order and respectfully requested.

Should the Examiner believe that anything further would be desirable to place this application in better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,



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